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(71) Applicant: **Smiths Industries Public Limited  
Company**  
**London, NW11 8DS (GB)**

(72) Inventor: **Pagan, Eric**  
**Hythe, Kent, CT21 6DA (GB)**

(74) Representative: **Flint, Jonathan McNeill et al**  
**765 Finchley Road**  
**London NW11 8DS (GB)**

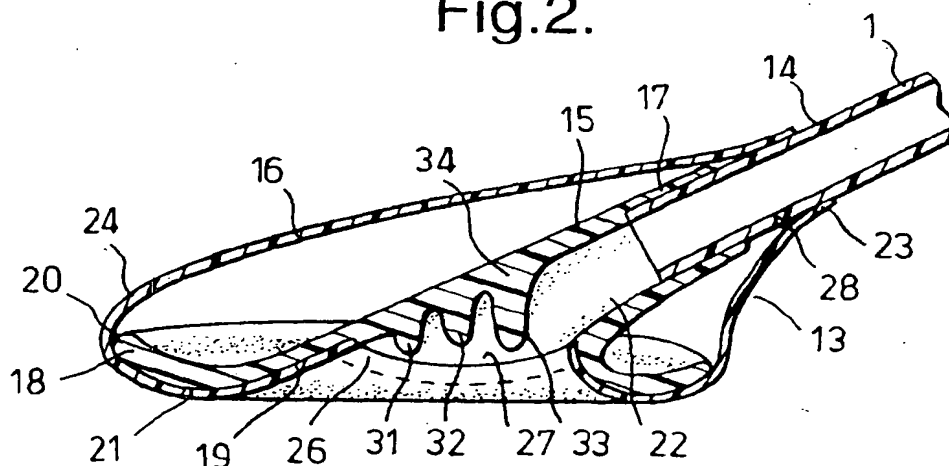
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(54) **Laryngeal mask**

(57) A laryngeal mask assembly has an elliptical mask portion 13 at the patient end 14 of a tube 1. The mask portion 13 has a mount 15 attached to the tube 1 and a cuff 16 extending around the periphery of the mount. The patient end 14 of the tube 1 opens into the centre of the mount 15, which has three lateral ribs 31,

32 and 33 projecting forwardly and extending parallel and spaced from one another. The forward end of the ribs have a concave profile 36 with rounded projections 37 at each end. The ribs 31 to 33 act to hold the epiglottis away from the tube opening during insertion of the assembly and to provide an air passage into the tube.

**Fig.2.**



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## Description

This invention relates to laryngeal mask assemblies of the kind comprising a tube with a mask portion at its patient end, the tube opening into the centre of the mask portion and the mask portion having a generally elliptical shape.

It is common practice to use an airway known as a laryngeal mask for the administration of anaesthetic and ventilation gases to a patient. These airways comprise a tube with an inflatable mask or cuff at one end, the tube being inserted in the patient's mouth so that one end is located in the hypopharynx and so that the mask forms a seal in this region with the surrounding tissue. Laryngeal masks are described in, for example, US 5355879, US 5305743, US 5297547, US 5282464, GB 2267034, US 5249571, US 5241956, US 5303697, GB 2249959, GB 2111394, EP 448878, US 4995388, GB 2205499, GB 2128561 and GB 2298797.

Laryngeal masks have several advantages over endotracheal tubes, which are longer and seal with the trachea below the vocal folds. One problem with laryngeal mask airways, however, is that there is a risk that the epiglottis can enter the air passage through the airway during insertion, thereby causing a blockage. In GB-A-2205499 there is described a laryngeal mask having bars extending across the patient-end opening of the tube into the mask, to prevent the epiglottis entering the opening.

It is an object of the present invention to provide an improved laryngeal mask assembly.

According to the present invention there is provided a laryngeal mask assembly of the above-specified kind, characterised in that the mask assembly has at least one member projecting down from the roof of the centre of the mask portion, so as to deflect the epiglottis away from the opening of the tube during insertion of the assembly.

The or each projecting member may be a rib extending laterally of the major axis of the elliptical shape of the mask portion. The lower end of the or each rib preferably has a concave profile with rounded projections at opposite ends. Alternatively, the or each projecting member may be a rib extending parallel to the major axis of the elliptical shape of the mask portion. The assembly may include three projecting members. In another arrangement, the or each projecting member may be a tooth with a rounded lower end. The mask portion preferably comprises a mount member attached with the tube and a cuff member attached with the mount member, the or each projecting member being moulded with the mount member.

A laryngeal mask airway assembly according to the present invention, will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side elevation view of the assembly;

Figure 2 is a sectional side elevation view of the patient end of the assembly to an enlarged scale;

5 Figure 3 is a view from below of the patient end of the assembly;

Figure 4 is a transverse sectional view along the line IV-IV of Figure 3;

10 Figure 5 is a view from below of the patient end of an alternative assembly;

Figure 6 is a sectional side elevation view of the patient end of the assembly shown in Figure 5; and

15 Figure 7 is a view from below of another alternative assembly.

20 With reference to Figures 1 to 4, the assembly comprises a bendable tube 1 of a plastics material, such as PVC, with a coupling 10 at its machine end 12. The tube 1 is curved along its length and has a mask portion 13 at its patient end 14.

25 The tube 1 is extruded with an inflation lumen 2 within its wall. The lumen 2 is connected towards the machine end of the assembly to an inflation line 3 with an inflation indicator and connector 4. The opposite, patient end of the inflation lumen 2 opens into the mask portion 13.

30 The mask portion 13 comprises a mount member 15 and a flexible bag member 16. The mount member 15 is moulded from a bendable plastics material, such as PVC. The mount member 15 has a hollow cylindrical sleeve 17 at its rear end, in which the forward, patient end 18 of the tube 1 is inserted and joined. The forward, patient end 18 of the mount member 15 is of an inverted dish shape with a generally elliptical or egg-shape outline and with a concave recess 19. The peripheral edge 20 of the mount member 15 is curved rearwardly to form a convex peripheral forward surface 21 lying on a flat plane inclined at an angle of about 30° to the axis of the patient end of the tube 1. The sleeve 17 has a bore 22 communicating with the passage through the tube 1, at its rear end, and opening into the recess 19 at its forward end.

35 The bag member 16 is blow moulded from a flexible, resilient plastics material, such as PVC, polyurethane, silicone, EVA, TPE, polyether block amide or the like. The bag 16 has a sock shape with an open ankle or neck portion 23 at its upper, rear end and an egg shape lower, forward foot portion 24 shaped with the same general outline as the mount member 15. The bag 16 encompasses the forward end of the assembly, enclosing the entirety of the mount 15 and having its neck 23 attached to the outside of the forward end 14 of the tube 1, such as by solvent, adhesive or welding. The bag 16 is also

attached to the concave recess 19 of the mount 15 along an annular band 26 extending around the opening of the bore 22, to seal the bag material to the mount. A hole 27 in the bag 16 provides access to the bore 22 in the mount member 15. The bag 16 provides an inflatable cuff at the forward end of the assembly and communicates with the inflation lumen 2 by means of an opening 28 cut through the outer surface of the tube 1 below the point where the bag is attached to the tube.

The mount member 15 also has, moulded with it, an epiglottis deflector provided by three stiff ribs 31 to 33, or similar members, projecting down from the roof 34 of the recess 19. Each rib 31 to 33 extends laterally (that is, at right angles to the major axis of the elliptical shape of the mask portion) across only the central part of the mount member and has inclined sides 35 and a concave central region 36 forming two rounded projections 37. The ribs are spaced from one another axially along the central part of the mount member 15 and project down about half the distance between the roof 34 and the forward surface 21. The deflector acts to deflect the epiglottis during insertion of the mask assembly. The epiglottis is kept away from the roof 34 of the recess 19 in a region of the recess that is wider than the epiglottis so that there is always an air passage between the epiglottis and the inside of the mask portion 13. The gaps between adjacent ribs 31 to 33, and the gaps between the ribs and the inside of the recess 19, ensure that air is free to flow around the ribs into and out of the tube 1 but they are too small to allow the epiglottis to enter the bore 22 and block passage of air along the tube. The deflector allows a suction catheter, or the like to be inserted along the tube 1 and project from the mask portion.

Various alternative forms of deflector are possible. For example, as shown in Figures 5 and 6, the deflector ribs 51 to 53 could be aligned longitudinally, that is parallel to the major axis of the elliptical shape of the mask portion. In such an arrangement, the forward end of the ribs is inclined smoothly from the roof of the recess.

Another arrangement is shown in Figure 7 in which the deflector takes the form of a group of six downwardly-projecting teeth 61 arranged in two rows of three teeth. The lower end of the teeth 61 are rounded to make them atraumatic to the epiglottis, as it slides over the end of the teeth.

### Claims

1. A laryngeal mask assembly comprising a tube (1) with a mask portion (13) at its patient end (14), the tube (1) opening into the centre of the mask portion (13) and the mask portion having a generally elliptical shape, characterised in that the mask assembly has at least one member (31 to 33, 51 to 53, 61) projecting down from the roof (34) of the centre of the mask portion (13), so as to deflect the epiglottis

away from the opening of the tube (1) during insertion of the assembly.

2. A laryngeal mask assembly according to Claim 1, characterised in that the or each projecting member is a rib (31 to 33) extending laterally of the major axis of the elliptical shape of the mask portion (13).
3. A laryngeal mask assembly according to Claim 2, characterised in that the lower end of the or each rib (31 to 33) has a concave profile (36) with rounded projections (37) at opposite ends.
4. A laryngeal mask assembly according to Claim 1, characterised in that the or each projecting member is a rib (51 to 53) extending parallel to the major axis of the elliptical shape of the mask portion (13).
5. A laryngeal mask assembly according to any one of the preceding claims, characterised in that the assembly includes three of the projecting members (31 to 33, 51 to 53).
6. A laryngeal mask assembly according to Claim 1, characterised in that the or each projecting member is a tooth (61) with a rounded lower end.
7. A laryngeal mask assembly according to any one of the preceding claims, characterised in that the mask portion (13) comprises a mount member (15) attached with the tube (1) and a cuff member (16) attached with the mount member (15), and that the or each projecting member (31 to 33, 51 to 53, 61) is moulded with the mount member (15).

Fig.1.

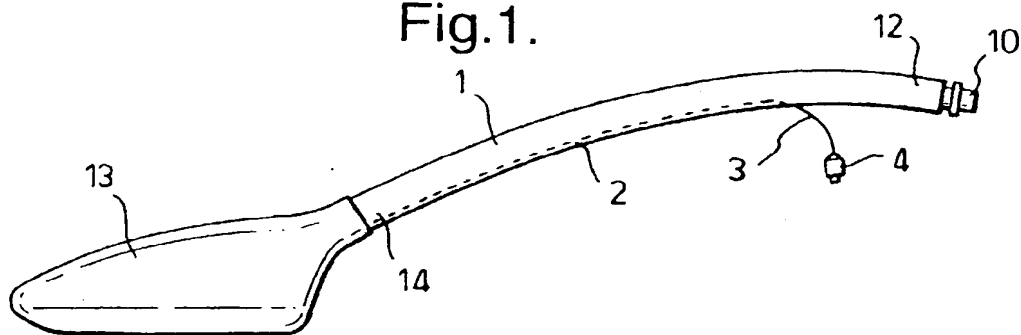


Fig.2.

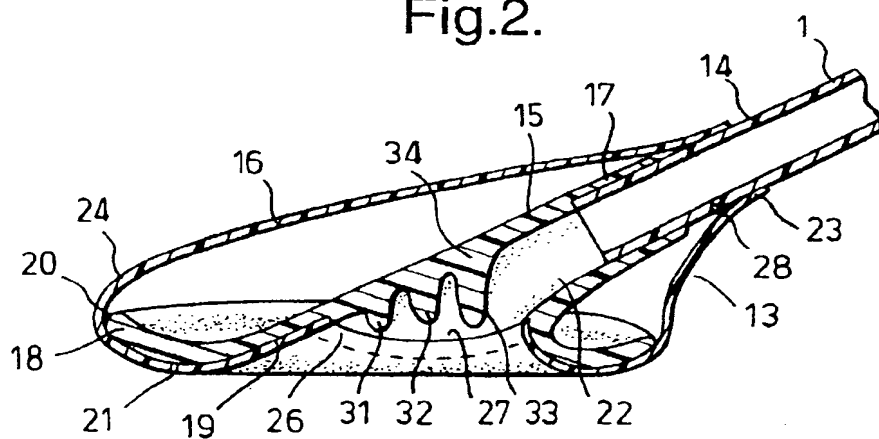


Fig.3.

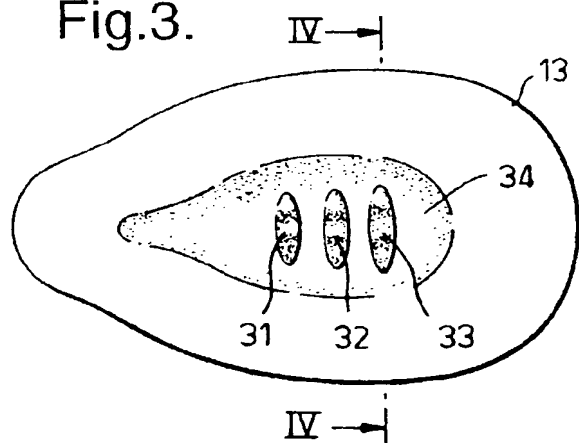


Fig.4.

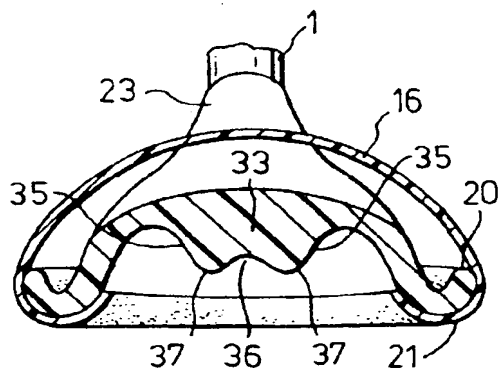


Fig.5.

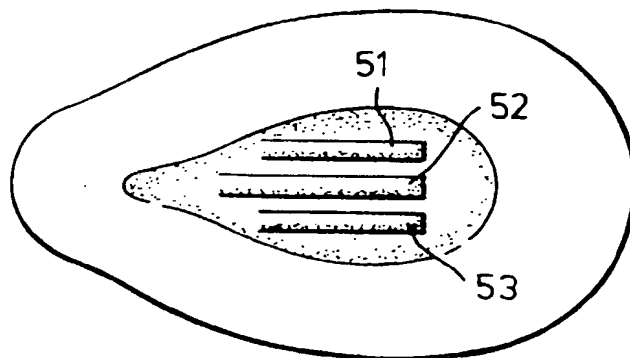


Fig.6.

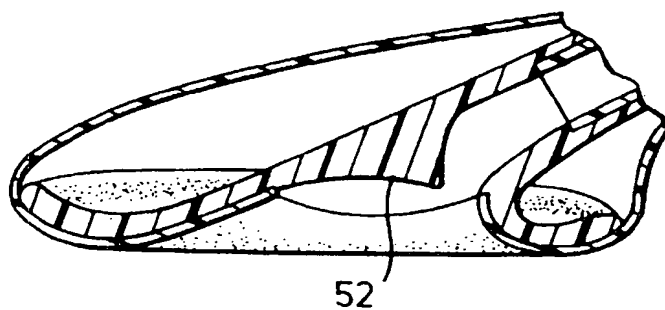
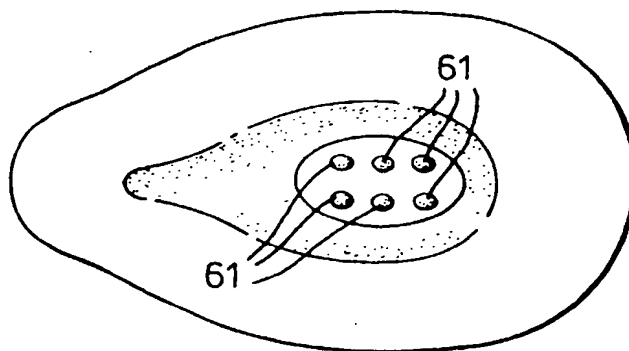


Fig.7.



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(72) Inventor: **Pagan, Eric**  
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London NW11 8DS (GB)

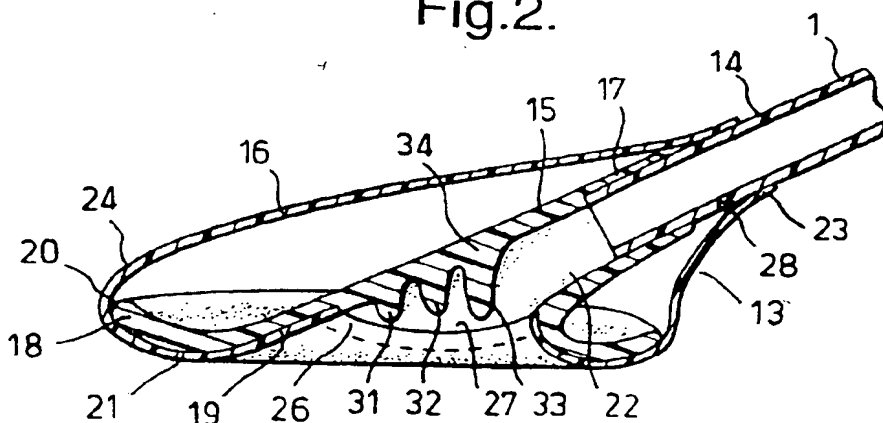
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**(54) Laryngeal mask**

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lateral ribs (31,32 and 33) projecting forwardly and extending parallel and spaced from one another. The forward end of the ribs have a concave profile (36) with rounded projections (37) at each end. The ribs (31 to 33) act to hold the epiglottis away from the tube opening during insertion of the assembly and to provide an air passage into the tube (1).

**Fig.2.**



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## EUROPEAN SEARCH REPORT

Application Number  
EP 98 30 1535

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			A61M
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		10 September 1999	Levert, C
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